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Patterns of Complications, Antibiotic Use, and Hospitalization in Dengue Fever among Children: A Tertiary Care Study in Bangladesh

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ABSTRACT

Background: *Dengue fever is a major pediatric health concern in Bangladesh, presenting with variable severity from self-limiting illness to life-threatening complications. Understanding patterns of complications, antibiotic use, and hospitalization is crucial for optimizing management and outcomes.*

Aim of the study: *To evaluate clinical manifestations, complications, antibiotic use, and hospitalization patterns among children with laboratory-confirmed dengue in a tertiary-care hospital in Bangladesh.*

Methods: *A cross-sectional study was conducted from July to October 2023 at Department of Pharmacology, Uttara Adhunik Medical College and Hospital, Dhaka, Bangladesh. A total of 361 children with laboratory-confirmed dengue were included. Data on demographics, clinical presentation, complications, antibiotic use, and hospitalization outcomes were extracted from medical records. Data were analyzed using SPSS v26. Descriptive statistics and multivariable logistic regression were performed to identify predictors of antibiotic administration.*

Result: *The median age was 4 years, with 54.85% males. Dengue fever (DF), dengue hemorrhagic fever (DHF), and dengue shock syndrome (DSS) were observed in 63.99%, 29.92%, and 6.09% of patients, respectively. Fever (100%), vomiting (49.03%), and abdominal pain (26.87%) were common presentations. Hepatic dysfunction (44.04%), hemorrhagic manifestations (27.98%), and plasma leakage (24.10%) were the most frequent complications. Antibiotics were administered to 32% of children, primarily guided by empiric suspicion of bacterial infection. Older age, severe disease, elevated inflammatory markers, pleural effusion/ascites, and ICU admission were significant predictors of antibiotic use. Median hospital stay was 6 days; ICU admission occurred in 8.03%, and mortality was 0.83%.*

Conclusion: *Pediatric dengue exhibits a broad spectrum of complications, with significant empiric antibiotic use in severe cases. Close monitoring, judicious antibiotic stewardship, and tailored management are essential to improve outcomes and minimize unnecessary antimicrobial exposure.*

Keywords: *Dengue fever, children, complications, antibiotic use, hospitalization, Bangladesh*

I. INTRODUCTION

Dengue fever, a mosquito-borne viral infection caused by the Flaviviridae family's dengue virus (DENV), manifests along a broad clinical continuum from self-limiting febrile illness to severe, potentially fatal complications including dengue hemorrhagic fever and dengue shock syndrome [1]. Globally, dengue causes an estimated 390 million infections each year, with approximately 96 million presenting with clinically apparent or subclinical manifestations [2]. A total of 316,160 dengue cases were recorded in Bangladesh, of which 40% were female, including 53,369 infected children aged 0–15 years (40% girls), with outbreaks reported across 64 districts [3]. Dengue typically manifests as a flu-like illness, presenting with high fever, headache, myalgia, arthralgia, rash, and occasionally gastrointestinal symptoms. Severe forms, including dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS), involve plasma leakage, hemorrhage, and circulatory collapse, posing significant morbidity and mortality risks [4]. Dengue is mainly transmitted by Aedes mosquitoes, notably Aedes aegypti and Aedes albopictus, which are day-biting vectors, with peak activity in early morning and late afternoon. Children are particularly vulnerable due to outdoor activity during these periods. Transmission occurs when a mosquito feeds on a viremic individual, acquiring the virus within the first week of infection, and subsequently transmitting it to others [5]. Bangladesh's climate, particularly during and after the monsoon, provides optimal conditions for Aedes mosquito breeding and survival. Climate change exacerbates this risk, as increased rainfall, frequent flooding, and rising temperatures prolong breeding seasons and enhance vector

longevity. Cities like Dhaka are densely populated, and infrastructure has not kept pace, producing many mosquitos breeding sites. [6]. Uncollected garbage, clogged drains, construction debris, and stagnant containers such as old drums, tires, and jars provide ideal breeding sites for Aedes mosquitoes. In areas with unreliable water supply, households often store water in drums or jars, further promoting vector proliferation. Limited awareness of preventive measures and poor living conditions, particularly in informal settlements, heighten exposure, placing children at greater risk of dengue transmission [7]. Dengue shock syndrome (DSS) is a critical complication of severe dengue, particularly in children, where plasma leakage into the extravascular space such as pleural effusion and ascites can cause hypovolemia and shock. In a Bangladeshi pediatric ICU study, children with severe dengue often required fluid resuscitation and inotropic support to stabilize circulatory collapse [8]. Plasma leakage in dengue hemorrhagic fever (DHF) leads to fluid accumulation in body cavities, such as the pleura and peritoneum, which has been frequently observed among children in Bangladesh. This effusion can cause respiratory distress and contribute to hypotension or shock. Ultrasound often reveals pleural effusion and ascites, necessitating careful monitoring, as plasma leakage may persist for several days [9]. Hemorrhage is another significant manifestation of dengue in children, ranging from minor bleeding, such as petechiae or gum bleeding, to major hemorrhagic events, including gastrointestinal bleeding and melena. Severe dengue can involve multiple organs, including the central nervous system [10]. The aim of this study was to characterize the patterns of complications, antibiotic use, and hospitalization among pediatric dengue patients in a tertiary-care hospital in Bangladesh.

II. METHODOLOGY & MATERIALS

This cross-sectional study was conducted in the in-patient Department of Bangladesh Shishu Hospital & Institute from July to October 2023 that evaluate demographic characteristics, clinical manifestations, complications, and determinants of antibiotic use among pediatric patients diagnosed with dengue infection. All children admitted with laboratory-confirmed dengue were consecutively enrolled, ensuring complete capture of eligible cases during the study period. Total 361 participants who were positive for rapid test (NS1-Ag, IgM, and IgG).

Inclusion Criteria:

- Children with laboratory-confirmed dengue infection (NS1 antigen and/or IgM/IgG serology
- Admission for clinical management of dengue.

Exclusion Criteria:

- Patients with incomplete clinical or laboratory records.
- Children referred after receiving definitive care elsewhere.

Ethical Considerations

Ethical approval was obtained from the institutional review board. As the study involved retrospective review of medical records, patient identity was anonymized and confidentiality strictly maintained. No direct patient contact occurred, and no additional investigations were performed for research purposes.

Data Collection

Data were extracted using a structured and standardized data abstraction form. Variables collected included sociodemographic information, clinical symptoms at presentation, vital signs, laboratory parameters, complications, use of antibiotics, and treatment outcomes. Diagnostic definitions adhered strictly to WHO criteria for dengue severity and related complications such as hepatic dysfunction, plasma leakage, acute kidney injury, and secondary bacterial infections. To ensure data integrity, two independent investigators cross-checked all entries, and discrepancies were resolved through chart review.

Statistical Analysis

Data were analyzed using SPSS v26. Categorical variables were summarized as frequencies and percentages, while continuous variables were expressed as medians with interquartile ranges (IQRs). Group comparisons were performed using the Chi-square test or Fisher's exact test for categorical variables and the Mann–Whitney U test for continuous variables. Multivariable logistic regression was used to identify independent predictors of antibiotic use. Candidate variables were selected based on clinical relevance and bivariate associations ($p < 0.10$). Adjusted odds ratios (aORs) with 95% confidence intervals (CIs) were reported. Model fitness was assessed using the Hosmer–Lemeshow test.

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III. RESULT

The age distribution showed that 13.02% of patients were under 1 year, 34.90% of patients were 1≤5 years, 32.96% of patients were 5≤10 years, and 19.11% of patients were ≥10 years. Males slightly predominated with (54.85%) of cases versus 163 females (45.15%). Clinically, dengue fever was observed in 63.99% of patients, dengue hemorrhagic fever in 29.92% of patients, and dengue shock syndrome in 6.09% of patients (Table 1). Table 2 showed that fever was universal, followed by vomiting in 49.03% of patients and abdominal pain in 26.87% of patients. Loose motions were reported in 19.11% of cases, cough in 6.93% of cases, headache in 3.88% of cases, and feeding reluctance in 3.05% of cases. Rare manifestations included bleeding, convulsions, body ache, and rash (each 1.94%), while breathing difficulty was observed in 1.11% of patients. Hepatic dysfunction was the most frequent complication (44.04%), followed by bleeding or other hemorrhagic manifestations (27.98%) and plasma leakage, including pleural effusion or ascites (24.10%) (Table 3). Shock (DSS) occurred in 6.09%, acute kidney injury or renal failure in 4.71%. Secondary bacterial infections were observed in 21.88% of cases. Table 4 presented that 32.00% of children received antibiotics, with a median duration of 5 days (IQR 3–7). Antibiotic use was primarily guided by empiric suspicion of bacterial infection (62.50%), while 37.50% had clinically confirmed bacterial infections. The most frequently administered antibiotic class was third-generation cephalosporins (50.00%). The median length of hospital stay for the study was 6 days (IQR 4–8) (Table 5). By disease severity, children with dengue fever (DF) had a median stay of 5 days (IQR 4–7), dengue hemorrhagic fever (DHF) 7 days (IQR 5–9), and dengue shock syndrome (DSS) 8 days (IQR 6–11). Intensive care unit (ICU) admission was required in 8.03% of cases, mortality occurred in 0.83%, and 1.94% of patients were readmitted within 30 days. Table 6 showed that children aged ≥10 years had higher odds of receiving antibiotics compared with those <5 years (aOR=1.80, 95% CI:1.10–2.90, p=0.02). Severe disease (DHF/DSS) was strongly associated with antibiotic administration (aOR=2.50, 95% CI:1.50–4.10, p<0.001), as were the presence of pleural effusion or ascites (aOR=2.20, 95% CI:1.20–3.90, p=0.008) and elevated inflammatory markers (CRP/procalcitonin; aOR=3.40, 95% CI:2.00–5.80, p<0.001). ICU admission was the strongest predictor (aOR=4.50, 95% CI:2.00–10.30, p<0.001).

Table 1: Demographic and Clinical Characteristics (n = 361)

Age (years)		Frequency	Percentage (%)
< 1		47	13.02
1 ≤ 5		126	34.90
5 ≤10		119	32.96
≥ 10		69	19.11
Sex	Male	198	54.85
	Female	163	45.15
Severity classification	Dengue fever (DF)	231	63.99
	Dengue hemorrhagic fever (DHF)	108	29.92
	Dengue shock syndrome (DSS)	22	6.09

Table 2: Clinical Presentation (Symptoms) on Admission (n = 361)

Symptoms	Frequency	Percentage (%)
Fever	361	100.00
Vomiting	177	49.03
Abdominal pain	97	26.87
Loose motion	69	19.11
Cough	25	6.93
Headache	14	3.88
Reluctant to feed	11	3.05
Bleeding	7	1.94
Convulsion	7	1.94
Body ache	7	1.94
Rash	7	1.94
Breathing difficulty	4	1.11

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Table 3: Complications during Hospitalization (n = 361)

Complication	Number of Patients (n)	Percentage (%)
Hepatic dysfunction	159	44.04
Bleeding / hemorrhagic manifestations	101	27.98
Plasma leakage (pleural effusion / ascites)	87	24.10
Shock (DSS)	22	6.09
Encephalopathy / altered consciousness	12	3.32
Acute kidney injury / renal failure	17	4.71
Secondary bacterial infection	79	21.88

Table 4: Antibiotic Use Patterns

Antibiotic Use Metric	Frequency (n)	Percentage (%)
Children given antibiotics	115	32
Median number of antibiotic days (IQR)	5 (3–7)	-
Indication for antibiotic use		
Empiric suspected bacterial infection	72	62.5
Clinically confirmed bacterial infection	43	37.5
Most common antibiotic classes used		
3rd-generation cephalosporins	58	50.0
Beta-lactam + β-lactamase inhibitor	29	25.0
Macrolides	17	15.0
Other	11	10.0

Table 5: Hospitalization Outcomes

Outcome Metric	Value
Median length of hospital stays	6 days (IQR 4-8)
Duration by severity	
DF (non-severe) median stay	5 days (IQR 4-7)
DHF median stay	7 days (IQR 5-9)
DSS median stay	8 days (IQR 6-11)
ICU admission	29 (8.03%)
Mortality	3 (0.83%)
Readmission within 30 days	7 (1.94%)

Table 6: Factors Associated with Antibiotic Use

Predictor	Adjusted Odds Ratio (aOR)	95% CI	p-value
Age ≥ 10 years (vs < 5)	1.80	1.10–2.90	0.02
DHF / DSS severity (vs DF)	2.50	1.50–4.10	<0.001
Bleeding manifestation present	1.60	0.90–2.80	0.10
Pleural effusion / ascites	2.20	1.20–3.90	0.008
Elevated CRP / procalcitonin	3.40	2.00–5.80	<0.001
ICU admission	4.50	2.00–10.30	<0.001

IV. DISCUSSION

In this study of pediatric dengue patients admitted to a tertiary care hospital in Bangladesh, we observed a wide spectrum of complications, notable antibiotic use, and varied patterns of hospitalization, reflecting the complex and evolving burden of dengue among children [11]. A slight male predominance (54.85% male) and 63.99% had non-severe dengue (DF), while 29.92% and 6.09% had DHF and DSS respectively in our study. Khan et al. reported a mean age of 8.8 years with a male predominance, and severity breakdown was roughly 71.1% non-severe and 28.9% severe dengue, similar in proportion to ours [12]. Fever was universal (100%), followed by vomiting (49.03%), abdominal pain (26.87%), loose motions (19.11%), cough (6.93%), and a variety of less common symptoms (headache, feeding reluctance, bleeding, convulsion, body ache, rash, breathing difficulty). Lita et al. identified vomiting (48.5%), abdominal pain

(55.9%), and diarrhea as common features [13]. Khan et al. also found all children had fever; gastrointestinal symptoms were predominant: vomiting in 80.4%, abdominal pain in 64.9%, constipation and decreased appetite also frequent [12]. Yesmin et al. stated that the most commonly presented clinical manifestations were fever (100.0%), headache (59.0%), myalgia (42.0%), rash (36.0%), retro-orbital pain (28.0%) and diarrhea (24.0%). Warning signs abdominal pain (40.0%) and persistent vomiting (29.0%), bleeding manifestations such as melena (17.0%), gum bleeding (7.0%) and epistaxis (6.0%) and evidence of plasma leakage such as oliguria (3.4%), ascites (2.4%), pleural effusion (1.4%), and shock (1.0%) were also present in the patients [14]. In this study, most frequent complication was hepatic dysfunction (44.04%), followed by bleeding/hemorrhagic manifestations (27.98%), plasma leakage (24.10%), shock (6.09%), acute kidney injury (4.71%), encephalopathy/altered consciousness (3.32%), and secondary bacterial infection (21.88%). MANDAL et al revealed thrombocytopenia (67.3%), elevated total serum bilirubin (33.3%), raised SGPT (53.75%), elevated INR (6.3%), and low serum albumin (26.3%) with a small proportion showing severe hepatic failure [15]. According to Lita et al. elevated SGOT and SGPT were present in 70.9% and 47.6%, respectively [13]. The observation of significant antibiotic use in children with dengue is not unique; several previous studies have documented on this. Shen et al. found that 28.2% of children <18 years with confirmed dengue received antibiotics in a 14-day window around diagnosis. Among hospitalized children, antibiotic prescription was 25.5% [16]. Udayasankar et al. stated that about 8.5% of all dengue patients were identified with secondary bacterial infection and required antibiotics; among those with persistent fever >5 days, 34.9% were culture-positive for bacterial pathogens [17]. In our study, median hospital stay was 6 days (IQR 4–8), increasing with severity: DF-5 days; DHF-7 days; DSS-8 days. ICU admission was required in 8.03% of patients; mortality was low at 0.83%; 1.94% were readmitted within 30 days. Similarly, Maksud et al. found prolonged hospital stays and frequent ICU requirement among children [18]. Khan et al. reported good outcomes overall, though detailed ICU and mortality data were not uniformly presented [12]. Antibiotic use was significantly more likely in children. Shen et al. reported that recipients were more likely to incur emergency department visits (odds ratio [OR]: 3.16; 95% CI: 2.62–3.81), hospitalizations (OR: 4.20; 95% CI: 3.48–5.07), and higher predicted medical care expenditures, dermatologic-related (OR: 1.83; 95% CI: 1.36–2.46), and gastrointestinal-related (OR: 1.67; 95% CI: 1.31–2.12) ADEs in a 30-day follow-up period [16].

Limitations of the study: This study has several limitations. Being a single-center, hospital-based, cross-sectional analysis, its findings may not be fully generalizable to all pediatric populations in Bangladesh. Retrospective data collection relied on medical records, which may have incomplete documentation or reporting bias. The study did not assess long-term outcomes or post-discharge complications. Laboratory confirmation focused on NS1 antigen and serology, potentially missing early or atypical cases. Additionally, antibiotic indications were partly empiric, limiting the precision of associations with bacterial infections.

V. CONCLUSION

This study highlights the diverse clinical spectrum and hospitalization patterns of pediatric dengue in a tertiary-care setting in Bangladesh. Hepatic dysfunction, hemorrhagic manifestations, and plasma leakage were the most frequent complications, while severe forms such as DSS, though less common, were associated with longer hospital stays and higher ICU admission rates. Antibiotic use was observed in nearly one-third of patients, largely guided by empiric suspicion of bacterial co-infection, with older age, severe disease, inflammatory markers, and ICU admission significantly predicting antibiotic administration. These findings underscore the need for vigilant monitoring, judicious antibiotic stewardship, and tailored management strategies to optimize outcomes and reduce morbidity among children with dengue.

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REFERENCES

[1]. Schaefer TJ, Panda PK, Wolford RW. Dengue fever. InStatPearls [Internet] 2024 Mar 6. StatPearls Publishing.
[2]. Bhatt S, Gething PW, Brady OJ, Messina JP, Farlow AW, Moyes CL, Drake JM, Brownstein JS, Hoen AG, Sankoh O, Myers MF. The global distribution and burden of dengue. Nature. 2013 Apr 25;496(7446):504-7.
[3]. UNICEF. Bangladesh Humanitarian Situation Report No. 6 (Dengue Outbreak), 15 December 2023 [Internet]. Available from: https://www.unicef.org/media/150136/file/Bangladesh%20Humanitarian%20Situation%20

Report%20No.%206%20%28Dengue%20Outbreak%29%2015%20December%202023.pdf?utm

[4]. WHO. *Dengue: a mosquito-borne disease* [Internet]. 28 May 2018. Available from: https://www.who.int/bangladesh/news/detail/28-05-2018-dengue-a-mosquito-borne-disease

[5]. UNICEF Bangladesh. *Dengue: How to keep children safe* [Internet]. 01 Sept 2025. Available from: https://www.unicef.org/bangladesh/en/stories/dengue-how-keep-children-safe?utm

[6]. Ogieuhi IJ, Ahmed MM, Jamil S, Okesanya OJ, Ukoaka BM, Eshun G, Ogaya JB, Lucero-Prisno III DE. Dengue fever in Bangladesh: rising trends, contributing factors, and public health implications. Tropical Diseases, Travel Medicine and Vaccines. 2025 Aug 11;11(1):26.

[7]. Hoque MM, Shourov MM, Giti S, Khan AA. Evaluation of Dengue virus serotypes by molecular test (RT-PCR) among the NS1 positive patients in a tertiary care hospital in Dhaka city. Bangladesh Med. Coll J. 2022;27(1):21-5.

[8]. Hoque S, Sarkar PK, Nawshad AS, Ahmed U. Clinical profile and outcome of dengue in children admitted in pediatric intensive care unit in Dhaka shishu (children) hospital, Dhaka, Bangladesh. Int J Med Heal Res. 2019 Dec;5(12):97-101.

[9]. Sultana H, Karim R, Rahman MS, Rahat SF, Rahman MM, Rahman MS, Sharmin R. Incidence of Plasma Leakage in Dengue Hemorrhagic Fever. Journal of Dhaka National Medical College & Hospital. 2020 Sep 30;26(2):10-4.

[10]. Newaz M, Huq M, Akter S, Nasrin T, Hossain F, Khanom A. Clinical and Laboratory Predictors of Mortality in Pediatric Patients with Severe Dengue at Dhaka Shishu Hospital. Journal of Rangpur Medical College. 2024 May 5;9(1):10-5.

[11]. Ghosh K, Tony SR, Islam K, Mobarak R, Alam MJ, Kamruzzaman M, Alam S, Talha M, Al Faisal A, Islam N, Hossain MM. Epidemiology of pediatric dengue virus infection, Scenario from a tertiary level hospital in Bangladesh. Journal of Infection and Public Health. 2025 Apr 1;18(4):102684.

[12]. Khan MA, Al Mosabbir A, Raheem E, Ahmed A, Rouf RR, Hasan M, Alam FB, Hannan N, Yesmin S, Amin R, Ahsan N. Clinical spectrum and predictors of severity of dengue among children in 2019 outbreak: a multicenter hospital-based study in Bangladesh. BMC pediatrics. 2021 Oct 29;21(1):478.

[13]. Lita AI. Correlation between Liver Function Test and Dengue Severity in Paediatric Patient. The Planet. 2024 Dec 28;8(01):57-62.

[14]. Yesmin S, Ahammad AM, Sarmin S, Rafi MA, Islam S, Hasan MJ. Clinical profile of pediatric cases of dengue during the 2019 epidemic in Bangladesh: a multicenter cross-sectional study. Mymensingh medical journal: MMJ. 2023 Apr;32(2):502-9.

[15]. MANDAL D, SHAH S, RATHOD H, VAGHELA D. A STUDY ON OUTCOME OF CHILDREN WITH DENGUE INFECTION AND ITS CLINICAL CORRELATION WITH HEPATIDYSFUNCTION IN A TERTIARY CARE HOSPITAL OF SAURASHTRA. INTERNATIONAL JOURNAL OF CONTEMPORARY PEDIATRICS. 2025;12(3):430-6.

[16]. Shen YJ, Lien CE, Chou YJ, Huang N, Tsai T. Antibiotic Use in Pediatric Dengue Cases in Taiwan: A National Administrative Database Analysis. The American Journal of Tropical Medicine and Hygiene. 2025 May 27;113(2):347.

[17]. Udayasankar S, Sivakumar V, Sundaramurthy R. Secondary bacterial infection in dengue fever and associated risk factors–An observational study in children. Journal of Pediatric Critical Care. 2020 Sep 1;7(5):243-8.

[18]. Maksud SI, Younus MS, Kabir S, Alauddin MF, Mollah MR. Clinical profile of severe dengue pediatric patients: A tertiary care hospital experience in Dhaka, Bangladesh. Shock.;20:62-50.